

Algebra 2
PRACTICE WITH COMPOSITION!

Mixed Practice:		$f(x) = -3x + 4$	$g(x) = 1 - 5x$				
$f(-5) = -3(-5) + 4$ $= 15 + 4 = \boxed{19}$	$(f - g)(x)$ $= -3x + 4 - (1 - 5x)$ $= -3x + 4 - 1 + 5x$ $= \boxed{2x + 3}$						
$f(g(3)) =$ $g(3) = 1 - 5(3) = 1 - 15 = -14$ $f(-14) = -3(-14) + 4$ $= 42 + 4 = \boxed{46}$	$f(x+2) = -3(x+2) + 4$ $= -3x - 6 + 4$ $= \boxed{-3x - 2}$						
$(f \cdot g)(x)$ \nearrow Your answer will have x in a # Don't plug in a # $= (-3x + 4)(1 - 5x)$ $= -3x + 15x^2 + 4 - 20x$ $= \boxed{15x^2 - 23x + 4}$		or <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>$-3x$</td> <td>4</td> </tr> <tr> <td>$-5x$</td> <td>$15x^2 - 20x$</td> </tr> </table>		$-3x$	4	$-5x$	$15x^2 - 20x$
$-3x$	4						
$-5x$	$15x^2 - 20x$						
Round 1:		$f(x) = x^2 - 2x + 3$	$g(x) = 4x - 2$				
$f(g(x)) = f(4x - 2)$ $= (4x - 2)^2 - 2(4x - 2) + 3$ $= (4x - 2)(4x - 2) - 8x + 4 + 3$ $= 16x^2 - 8x - 8x + 4 - 8x + 4 + 3$ $= \boxed{16x^2 - 24x + 11}$	$g(f(x)) = g(x^2 - 2x + 3)$ $= 4(x^2 - 2x + 3) - 2$ $= 4x^2 - 8x + 12 - 2$ $= \boxed{4x^2 - 8x + 10}$						

Watch out for constants!**"Constant" function**

Round 2: $f(x) = x^2 - 2x + 3$ $g(x) = 8$	
$f(g(x)) = f(8)$ $= 8^2 - 2(8) + 3$ $= 64 - 16 + 3$ $= 48 + 3 = \boxed{51}$	$g(f(x)) = g(x^2 - 2x + 3)$ $= \boxed{8}$ $(g(x) = 8 \text{ all the time no matter what } x \text{ is!})$
Round 3: $f(x) = -2x + 3$ $g(x) = x^2 - 1$ $h(x) = 7$	
$f(g(x)) = f(x^2 - 1)$ $= -2(x^2 - 1) + 3$ $= -2x^2 + 2 + 3$ $= \boxed{-2x^2 + 5}$	$g(f(x)) = g(-2x + 3)$ $= (-2x + 3)^2 - 1$ $= (-2x + 3)(-2x + 3) - 1$ FOIL $= 4x^2 - 12x + 9 - 1$ $= \boxed{4x^2 - 12x + 8}$
$g(h(x)) = g(7)$ $= 7^2 - 1$ $= 49 - 1$ $= \boxed{48}$	$h(g(x)) = h(x^2 - 1)$ $= \boxed{7}$ $(h(x) \text{ is } 7 \text{ all the time no matter what } x \text{ is})$

Round 4:

$f(x) = x^2 - 3x - 1$

$g(x) = 5x + 2$

$h(x) = 3x$

$h(f(x)) = h(x^2 - 3x - 1)$

$= 3(x^2 - 3x - 1)$

$= 3x^2 - 9x - 3$

$g(f(x)) = g(x^2 - 3x - 1)$

$= 5(x^2 - 3x - 1) + 2$

$= 5x^2 - 15x - 5 + 2$

$= 5x^2 - 15x - 3$

$f(h(x)) = f(3x)$

$= (3x)^2 - 3(3x) - 1$

$= 9x^2 - 9x - 1$

$f(g(x)) = f(5x + 2)$

$= (5x + 2)^2 - 3(5x + 2) - 1$

$= (5x + 2)(5x + 2) - 15x - 6 - 1$

$= 25x^2 + 20x + 4 - 15x - 7$

$= 25x^2 + 5x - 3$

Round 5:

$f(x) = x^3$

$g(x) = 3 - x$

$h(x) = 3 - 4x^2$

$g(g(x)) = g(3 - x)$

$= 3 - (3 - x)$

$= 3 - 3 + x$

$= x$

$h(f(x)) = h(x^3)$

$= 3 - 4(x^3)^2$

$= 3 - 4x^6$

$h(g(x)) = h(3 - x)$

$= 3 - 4(3 - x)^2$

$= 3 - 4(3 - x)(3 - x)$ FOIL

$= 3 - 4(9 - 6x + x^2)$

$= 3 - 36 + 24x - 4x^2$

$= -4x^2 + 24x - 33$

$g(h(x)) = g(3 - 4x^2)$

$= 3 - (3 - 4x^2)$

$= 3 - 3 + 4x^2$

$= 4x^2$

Round 6: $f(x) = -5$ $g(x) = -2x^2 - x$ $h(x) = 10 - 3x$	
$g(f(x)) = g(-5)$ $= -2(-5)^2 - (-5)$ $= -2(25) + 5$ $= -50 + 5 = -45$	$f(g(x)) = f(-2x^2 - x)$ $= -5$ (f is -5 no matter what x is)
$h(h(f(x))) = h(h(-5))$ $h(-5) = 10 - 3(-5) = 10 + 15 = 25$ $= h(25) = 10 - 3(25)$ $= 10 - 75 = -65$	$g(h(x)) = g(10 - 3x)$ $= -2(10 - 3x)^2 - (10 - 3x)$ $= -2(10 - 3x)(10 - 3x) - 10 + 3x$ $= -2(100 - 60x + 9x^2) - 10 + 3x$ $= -200 + 120x - 18x^2 - 10 + 3x$ $= -18x^2 + 123x - 210$

Progress Checker

Round	Completed!	Round	Completed!
1		4	
2		5	
3		6	